

HVAC PIPING AND INSTRUMENTATION LEGEND AND SYMBOLS

PIPING AND INSTRUMENTATION LEGEND AND SYMBOLS

- VENTURI TUBE OR FLOW NOZZLE
- PITOT TUBE OR PITOT VENTURI TUBE, ANNUBAR
- AVERAGING PITOT TUBE (ACAMS PORT)
- PRESSURE OR SAFETY VALVE
- VACUUM RELIEF VALVE
- BALANCING VALVE (FLOW CONTROL)
- FLOW CONTROL VALVE (SELF-REGULATING)
- BUTTERFLY VALVE (MOTOR OPERATOR SHOWN)
- ANGLE VALVE (SOLENOID OPERATOR SHOWN)
- 2-WAY VALVE (PNEUMATIC DIAPHRAGM OPERATOR SHOWN)
- 3-WAY VALVE (PNEUMATIC PISTON OPERATOR SHOWN)
- SOLENOID OPERATOR
- MOTOR OPERATOR
- PNEUMATIC DIAPHRAGM OPERATOR
- PNEUMATIC PISTON OPERATOR
- AIRTRIL FITTING
- PRESSURE SENSOR

- FLOW DIRECTION
- GLV GLOBE VALVE
- BVV BUTTERFLY VALVE
- GV GATE VALVE
- BV BALL VALVE
- PV PLUG VALVE / PLUG COCK
- CV CHECK VALVE
- GATE VALVE WITH PLUG
- STR STRAINER
- AAV AUTOMATIC AIR VENT
- MAV MANUAL AIR VENT
- THERMOMETER
- PRESSURE GAUGE WITH COCK AND SNUBBER
- PRESSURE DIFFERENTIAL GAUGE
- FLEX CONN (REFRIG)
- FILTER DRIER
- SIGHT GLASS
- FLEXIBLE HOSE (FLANGED ENDS)
- FLEXIBLE HOSE (SCREWED ENDS)
- UNION
- ANCHOR
- ALIGNMENT GUIDE

INSTRUMENT IDENTIFICATION

FIRST LETTER		SUCCEEDING LETTERS		
MEASURED OR INITIATING VARIABLE	MODIFIER	READOUT OR PASSIVE FUNCTION	OUTPUT FUNCTION	MODIFIER
A ANALYSIS		ALARM		
B BURNER, COMBUSTION		USERS CHOICE	USERS CHOICE	USERS CHOICE
C USERS CHOICE			CONTROL	
D USERS CHOICE	DIFFERENTIAL			DETECTOR
E VOLTAGE		SENSOR (PRIMARY ELEMENT)		
F FLOW RATE	RATIO(FRACTION)			
G USERS CHOICE		GLASS, VIEWING DEVICE		
H RELATIVE HUMIDITY				HIGH
I CURRENT (ELECTRICAL)		INDICATE		
J POWER	SCAN			
K TIME, TIME SCHEDULE		TIME RATE OF CHANGE	CONTROL STATION	
L LEVEL		LIGHT		LOW
M USERS CHOICE	MOMENTARY			MIDDLE OR INTERMEDIATE
N USERS CHOICE		USERS CHOICE	USERS CHOICE	USERS CHOICE
O USERS CHOICE		ORIFICE (RESTRICTION)		
P PRESSURE, VACUUM		POINT (TEST CONNECTION)		
Q USERS CHOICE	INTEGRATE, TOTALIZE			
R RADIATION		RECORD		
S SPEED, FREQUENCY, SMOKE SAFETY			SWITCH	
T TEMPERATURE			TRANSMIT	
U MULTIVARIABLE		MULTIFUNCTION	MULTIFUNCTION	MULTIFUNCTION
V VIBRATION, MECHANICAL ANALYSIS			VALVE, DAMPER, LOUVER	
W WEIGHT, FORCE		WELL		
X UNCLASSIFIED	X AXIS	UNCLASSIFIED	UNCLASSIFIED	UNCLASSIFIED
Y EVENT, STATE OR PRESENCE	Y AXIS		RELAY, COMPUTE, CONVERT	
Z POSITION, DIMENSION	Z AXIS		DRIVER, ACTUATOR, UNCLASSIFIED FINAL CONTROL ELEMENT	

GENERAL NOTES

1. BEFORE STARTING WORK, VERIFY LOCATIONS, ELEVATIONS AND SIZES OF ALL DUCTWORK REQUIRING CONNECTIONS.
2. COORDINATE ALL DUCTWORK WITH ALL OTHER WORK TO AVOID CONFLICTS. RUN ALL DUCTS TO AVOID ARCHITECTURAL OPENINGS, STRUCTURAL MEMBERS, OR OTHER OBSTRUCTIONS. RUN DUCTS TIGHT TO BOTTOM OF STRUCTURAL MEMBERS UNLESS OTHERWISE NOTED. OFFSET DUCTS WHERE REQUIRED. INSTALL ALL DUCTWORK AND PIPING TO BEST SUIT FIELD CONDITIONS AND COORDINATE WITH THE INSTALLATION WORK OF OTHER TRADES. THE DRAWINGS ARE DIAGRAMMATIC AND SHALL NOT BE SCALED TO DETERMINE EXACT LOCATION OF MECHANICAL WORK.
3. ALL DIFFUSER SIZES AND DUCT SIZES SHOWN ARE NET DIMENSIONS UNLESS OTHERWISE INDICATED.
4. PROVIDE AND INSTALL ALL NECESSARY DAMPERS TO BALANCE THE AIR DISTRIBUTION SYSTEM TO WITHIN +/- 5% OF THE AIR QUANTITIES SHOWN ON CONSTRUCTION DOCUMENTS. ALL DUCT BRANCHES TO AIR OUTLETS SHALL BE PROVIDED WITH VOLUME DAMPERS.
5. MOUNT ALL THERMOSTATS AT HEIGHT APPROVED BY APPLICABLE CODE OF REGULATIONS.
6. PROVIDE AND INSTALL ALL THREADETS AND OTHER NECESSARY FITTINGS IN PIPING AND DUCTWORK REQUIRED FOR CONTROL AND MEASURING DEVICES.
7. CONTRACTOR MAY USE AT MOST 6-FEET OF FLEXIBLE DUCT RUN TO THE AIR TERMINAL.
8. PROVIDE 1/2" WIRE MESH SCREENS AT ALL INTAKE AND EXHAUST OPENINGS INSIDE. PROVIDE 1/4" STAINLESS STEEL WIRE FOR OUTDOOR INSTALLATION. INSECT SCREEN SHALL BE INSTALLED AS NECESSARY.
9. ALL VISIBLE INTERIOR PORTIONS OF DUCTWORK AND AIR TERMINALS SHALL BE PAINTED FLAT BLACK UNLESS OTHERWISE NOTED.
10. COORDINATE WITH OTHER TRADES TO INSURE THAT 24"x24" ACCESS PANEL OR AS INDICATED ARE PROVIDED FOR ALL CONCEALED COILS, VAV BOXES, FIRE DAMPERS, CONTROL VALVES AND VOLUME DAMPERS.
11. ALL POWER AND INTERLOCK WIRING SHALL BE INSTALLED UNDER DIVISION 16. LINE VOLTAGE CONTROL WIRING AND LOW VOLTAGE (24 VOLT) CONTROL WIRING SHALL BE INSTALLED UNDER DIVISION 15.
12. ALL FLOOR MOUNTED EQUIPMENT SHALL BE INSTALLED ON 4" CONCRETE PADS UNLESS OTHERWISE INDICATED. PAD SHALL BE 3" WIDER (1" IN EACH DIRECTION) THAN EQUIPMENT FOOT PRINT.
13. ALL ROOFTOP EQUIPMENT SHALL BE INSTALLED ON PRE-FABRICATED CURBS.
14. IMMEDIATELY REPORT TO THE OWNER'S REPRESENTATIVE ANY OBSERVATIONS OF EXISTING CONDITIONS WHICH ARE DISCOVERED IN THE BUILDING AND WHICH MAY PREVENT THE CORRECT INSTALLATION OF THE HVAC SYSTEM.
15. ALL NOTED DUCT DIMENSIONS ARE CLEAR INSIDE DIMENSIONS UNLESS INDICATED OTHERWISE.
16. RECTANGULAR DUCTWORK ELEVATIONS ARE BOTTOM OF DUCT, ROUND DUCTWORK ELEVATIONS ARE CENTERLINE UNLESS NOTED OTHERWISE.
17. DIFFERENTIAL AIR PRESSURES INDICATED ON DRAWINGS ARE IN INCHES OF WATER.
18. AIR FLOWS SHOWN IN CUBIC FEET PER MINUTE (CFM) ARE ACTUAL FLOWS (ACFM) AT THE SITE ELEVATION ABOVE SEA LEVEL.
19. ALL EQUIPMENT SUPPORTS, FOUNDATIONS, PADS, WALL OPENINGS OR PENETRATIONS SHALL BE VERIFIED WITH ACTUAL PURCHASED EQUIPMENT FOR SIZE AND FIT. THE EQUIPMENT SIZES INDICATED ON THE DRAWINGS WERE SELECTED FOR ENGINEERING DESIGN AND SPACE ALLOCATION PURPOSES. THE ACTUAL SIZE MAY VARY DEPENDING ON THE PURCHASED EQUIPMENT TO BE INSTALLED.

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				A	10/31/95	TDM	PRELIMINARY DESIGN REVIEW		

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100 WEST WALNUT STREET
PASADENA, CALIFORNIA

LIGO
CALIFORNIA INSTITUTE OF TECHNOLOGY
MASSACHUSETTS INSTITUTE OF TECHNOLOGY

LASER INTERFEROMETER
GRAVITATIONAL-WAVE OBSERVATORY
SITE NO. 1 - HANFORD, WASHINGTON

TITLE	LEGEND AND GENERAL NOTES
SCALE	NONE
CONTRACT NUMBER	PP150969
PROJECT NUMBER	8094
SHEET NUMBER	WA-H-002
REVISION	

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